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Constructing Bald Eagle Nests With Natural Materials

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A technique for using natural materials to build artificial nests for bald eagles *(Haliaeetus leucocephalus)* and other raptors is detailed. Properly constructed nests are as permanently secured to the nest tree or cliff substrate as any eagle-built nest or humanmade platform. Construction normally requires about three hours and at least two people. This technique is simple, effective, physically and aesthetically unobtrusive, and free of material hassles.

Keywords: bald eagle, *Haliaeetus leucocephalus*, artificial nests, nest construction

Introduction

Constructing artificial nests and nest structures (such as poles, towers, platforms, boxes, and baskets) to replace fallen nests, enhance potential breeding habitat, or encourage relocation of nesting activity is an established practice for raptor management (Call 1979, Olendorff et al. 1980, Millsap et al. 1987). This approach has often been used with bald eagles (*Haliaeetus leucocephalus*) to maintain or restore reproductive activity after a nest has come down (Dunstan and Borth 1970, Postupalsky 1978, Grubb 1980a). However, virtually all of the techniques described to date involve some form of unnatural structure or support. These construction materials are often obtrusive, aesthetically unpleasant, and frequently difficult to secure in tree branches. After climbing into bald eagle nests for 30 years and constructing 12 artificial nests in Arizona, Washington, and California, my approach has evolved from a totally humanmade support structure (Grubb 1980a, 1983), through expanded-aluminum and wire-mesh "baskets" in original nest trees (Grubb 1980b, Grubb et al. 1982), to the technique described herein that relies entirely on natural materials. This approach is simple, effective, physically and aesthetically unobtrusive, and free of material hassles.

This construction technique should be easily adaptable to any stick-nesting raptor, if overall nest size is appropriately scaled down and component sticks, filler, and lining materials are consistent with those used by the target species.

Materials

Nest Construction

Grubb and Eakle (1987) described mean stick size for 16 bald eagle nests in Arizona: diameter—1.7 cm

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(s.d.=0.3, range=0.3–6.0 cm); length—86.4 cm (s.d.=18.4, range=22.9–243.8 cm); and weight—129.3 g (s.d.=44.1, range=5.0–760.0 g). These stick sizes appear comparable throughout the bald eagle's range (pers. observation). Nest sticks should vary within the overall size range. Only dead material should be used. This is usually readily available in the surrounding forest as ground litter, on fallen or dead trees, as dried flotsam or high-water debris piles along shorelines, or in slash piles from timber harvesting activity. Fallen nests make excellent sources of both sticks and nest lining, as long as these materials are not rotten or wet. It is important to use dry, sound, and durable materials in nest construction.

Partially decomposed ground litter (found between the overlying needle/leaf layer and the soil layer beneath) effectively fills between the sticks after the nest begins to take shape. This simulates the decaying litter-like material that typically solidifies the interior portions of older bald eagle nests. Dried pine needles, crushed-dried leaves, dried lichens, clumps of moss, and similar materials can all be used to help fill in the center portion of the artificial nest.

The actual nest surface is best lined with dried, broken-up, or partially shredded grasses or other thin, narrow-leafed herbaceous material. Sometimes bald eagles will also use shredded bark for the lining. Sufficient lining material should be collected to permit working it into the surrounding nest sticks and filler while providing a thin, covering layer across the nest surface.

Equipment

Sticks can be collected by the armful, but a bucket, duffel bag, or small tarp greatly facilitates transporting filler and lining materials. Sticks can be tied together in bundles or loaded into large duffel bags for hauling up the nest tree. Duffels are easier to raise and manipulate through tree branches. Using two bags permits ground personnel to be filling one bag while the other person is up the tree. A length of rope at least two times the planned nest height and at least one small pulley ease the task of raising nest materials. A longer line and a second pulley affixed about chest height to a nearby tree permit a continuous clothesline configuration that raises materials at an angle, avoiding many of the entangling branches near the bole of the nest tree.

Personnel

A minimum of two people is required: one to climb the tree and construct the nest, and one on the ground to pack and raise nest material via rope and pulley. An additional one to two people on the ground can be helpful for gathering, loading, and raising nest material. It is best to collect and separately pile all materials before sending the nest constructor/climber up the designated nest tree.

Methods

Figure 1 shows the progressive construction of an artificial bald eagle nest. To facilitate documentation of the process, this nest was constructed just above ground level in tree branches sunk into post holes. Aside from proximity to the ground, all other features of this nest construction are as they would be under actual field conditions.

Step 1

Lay several sticks, one at a time, across the selected crotch or support branches. These initial sticks do not have to be wedged or solidly anchored but simply supported by other branches or forks in the nest tree. Maximize the angle between these sticks when positioning them. Typically a rough triangle configuration results (figure 1A).

Step 2

Continue adding sticks, one at a time, interlocking or weaving each one into the others as much as possible. Also continue varying the direction of placement, working through the center of the nest and around the increasing perimeter. Vary stick size and diameter throughout construction (figure 1B).

Step 3

Continue the process of Step 2, interlocking nest sticks and interlacing perimeter ones around the support branches. Avoid just piling sticks across the growing structure as this tends to weaken it (figure 1C).

Step 4

As the nest reaches approximately half of the intended depth (~0.3 m for bald eagles), begin working sticks into the structure in a more circular pattern. Continue interlocking sticks and interlacing them around support branches. Occasionally, climb above and tamp down on the structure with a boot and partial body weight and/or grasp a handful of sticks in the interior of the structure and vibrate or shake them to settle and solidify the nest (figure 1D).

Step 5

Continue adding sticks to the nest until it nears the intended size (~1.8 m diameter by ~0.6 m deep recommended). At least once before construction reaches full size, pour 15–20 l of filler onto the center of the nest and keep working it into the sticks until it essentially disappears into the center of the structure. Continue building the nest to full size, raising the

1A

1B

Figure 1.— Progressive stages in the construction of a 1.7-m by 0.5-m artificial bald eagle nest (built just above ground level for demonstration purposes).

1C

1D

Figure 1.— Continued.

1E

1F

Figure 1.— Continued.

nest perimeter 8–10 cm above the nest center. Follow with a second addition of filler, which should be worked into the nest until it just covers most interior sticks (figure 1E).

Step 6

The final step involves adding sufficient lining material to soften and cover the interior portion of the nest. This material should be worked into the perimeter sticks and mixed with the top layer of filler. Additional sticks can be added as necessary around the perimeter. The final nest surface should approximate the concavity of a dinner plate. If the nest is properly constructed, it should easily support a grown person's weight, which can also help condense and solidify the structure (figure 1F).

(Note: For cliff nests, the steps are similar, except for Step 1 where initial sticks are laid on a ledge or other suitable surface and worked into or around any available cracks, rocks, or irregularities to help anchor the structure. A large branch or two, perhaps several meters in length, can sometimes span a gap, bridge an area of loose rock, or otherwise increase and/or stabilize the cliff nest substrate. Nests built on cliff ledges are usually very shallow, often less than 0.3 m deep.)

Results

The result of this construction process is a strong, durable, natural-appearing nest. The tree nest in figure 1 when completed measured 1.7 m diameter and 0.5 m deep. Working alone, I spent two hours gathering nest materials and 45 minutes building the nest. Construction under actual field conditions in trees or on cliffs normally requires about three hours and at least two persons. Nests properly constructed in this manner are as permanently secured to the nest tree or cliff substrate as any eagle-built nest or humanmade platform.

Of the 13 artificial nests described in table 1, two remain intact; seven were lost when nest trees, branches, or supporting substrate fell; one nest tree and stand burned; one nest eventually weathered away; and two structures were removed after flooding. Nest repair was observed at three of the seven unused nests (43%) during the first or second breeding season following construction, but eggs were never laid. Only one of six artificial nests (17%) in new locations attracted nesting bald eagles. This nest was not used until five years after construction and it was built at an historical site on Catalina Island, CA, with sticks from and in the exact location of a nest described (p. 323) and photographed (Plate 90) by Bent (1961) on 22 February 1929. Five of seven artificial nests (71%) that replaced fallen or flooded nests were subsequently used by breeding eagles.

Discussion

Nest tree characteristics are well documented in the literature (egs. Andrew and Mosher 1982, Stalmaster 1987, Anthony and Isaacs 1989) and are beyond the scope of this paper. However, for actual

Table 1.— Construction, type, use, and longevity of 13 artificial bald eagle nests built in Arizona, California, and Washington between 1978 and 1986.

				Years	
Construction	State	Type	Year built	Used[a]	Intact
Built in new tree/location (not by author)	CA	Platform	1977	0	≥2[b]
Replaced fallen nest tree	AZ	Tripod	1978	1	1
Replaced flooded tripod	AZ	Platform	1978	1	1
Replaced fallen tree nest	AZ	Basket	1978	1	7
Relocated tripod	AZ	Tripod	1979	0	1
Built in new tree/location	AZ	Basket	1979	0	8
Replaced fallen cliff nest	AZ	Sticks	1981	4	8
Replaced flooded tree nest	AZ	Tower	1982	0	4
Replaced tree nest support	AZ	Tower	1983	0	5
Built in new tree	WA	Basket	1982	0	≥11[b]
Replaced fallen tree nest	AZ	Basket	1984	2	2
Built on new cliff	AZ	Basket	1984	0	>11
Built new nest on historical cliff[c]	CA	Sticks	1986	5	>9

[a] *Years used = number of years incubation occurred on nest.*
[b] *Longevity uncertain.*
[c] *1929 Catalina Island site (Bent 1961).*

tree selection and nest placement, the original situation should be duplicated as closely as possible. Incorporating local expertise on nesting eagles is also strongly recommended.

Artificial nests can be placed in broken topped trees, among forked branches forming crotches with the trunk, or in most any branch configuration that (a) allows placement of the initial sticks, (b) will support the size and shape of the intended nest, and (c) will provide accessibility for birds with nearly 2-m wingspans. Minimal, selective pruning may be necessary to open up an inaccessible but otherwise good nest location. The nest should be as high as possible in the tree.

The branch configuration depicted in figure 1 demonstrates an extreme situation where no actual crotch or primary supporting branch was available. Nevertheless, it was possible to interlace the nest sticks among the supporting branches so as to completely anchor the nest both horizontally and vertically. Thus, this technique, much like the nest platform, can be adapted to trees that might not otherwise be structurally suitable for nesting bald eagles. The natural-material approach also has the advantage of excluding intrusive hardware that could potentially harm the nest tree by jeopardizing its strength or longevity.

Patience is the key to effective construction. Building the nest a stick at a time and interlocking the sticks produce the best results by most closely simulating natural avian construction. The tendency to speed construction by simply piling sticks onto the structure should be avoided. Another tendency is to use sticks too large in diameter. Working with materials from a fallen nest or studying other nests in the vicinity should help with sizing nest materials properly.

Artificial nests are frequently proposed as mitigation alternatives in habitat conflicts. While this strategy has been successful with golden eagles (*Aquila chrysaetos*; Postovit and Postovit 1987), placing artificial nests in new locations does not readily attract bald eagles. Bald eagles have the greatest use for artificial nests when they replace fallen, recently active nests.

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